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Tuberculosis of the Fallopian Tubes.

(Preliminary Paper.)

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TUBERCULOSIS OF THE FALLOPIAN TUBES.

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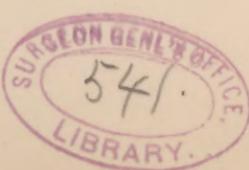
WE report the cases in this paper in detail, because we think that the frequency of genital tuberculosis in women is not generally recognized by the medical profession.

Much light has been thrown on that very large class of diseases called by the unsystematic name of "pelvic inflammatory troubles" by the discovery of "unsuspected tuberculosis" of the Fallopian tubes, to which attention was first called by Williams, of Johns Hopkins Hospital.

The term unsuspected tuberculosis is applied to those cases of tuberculosis of the Fallopian tubes in which there is nothing in the objective symptoms and in the macroscopic appearance of the tubes, ovaries, or peritoneum to indicate the character of the disease. The tubes and ovaries present the same gross appearance which we see in more specific chronic salpingitis with adhesions; and it requires a microscopical and bacteriological examination to determine that tuberculosis is the cause, or, at any rate, the accompaniment of the condition.

During the past winter we have made careful examination of all the Fallopian tubes which we have removed for any form of salpingitis. The total number of cases in which cœliotomy was done for salpingitis is twenty-five. In two of these cases the tuberculous character of the disease was manifest as soon as the abdomen was opened, from the presence of the tubercles upon the peritoneum of the tubes, uterus, intestines, etc. In three other cases the real nature of the disease was not suspected until a microscopical examination had been made of the tubes and the characteristic tubercular lesions and bacilli had been found. These three cases, therefore, belong to the class called unsuspected tuberculosis.

CASE I.—R. W., American, white, thirty-six years of age, single, dressmaker, admitted to the University Hospital, November, 1893. Menstruation first appeared in the twelfth year, and until January, 1893, was always regular, occurring every three weeks, and lasting usually two to three days. From January until March, 1893, she had almost continuous uterine hemorrhage (every two to three days), but from this



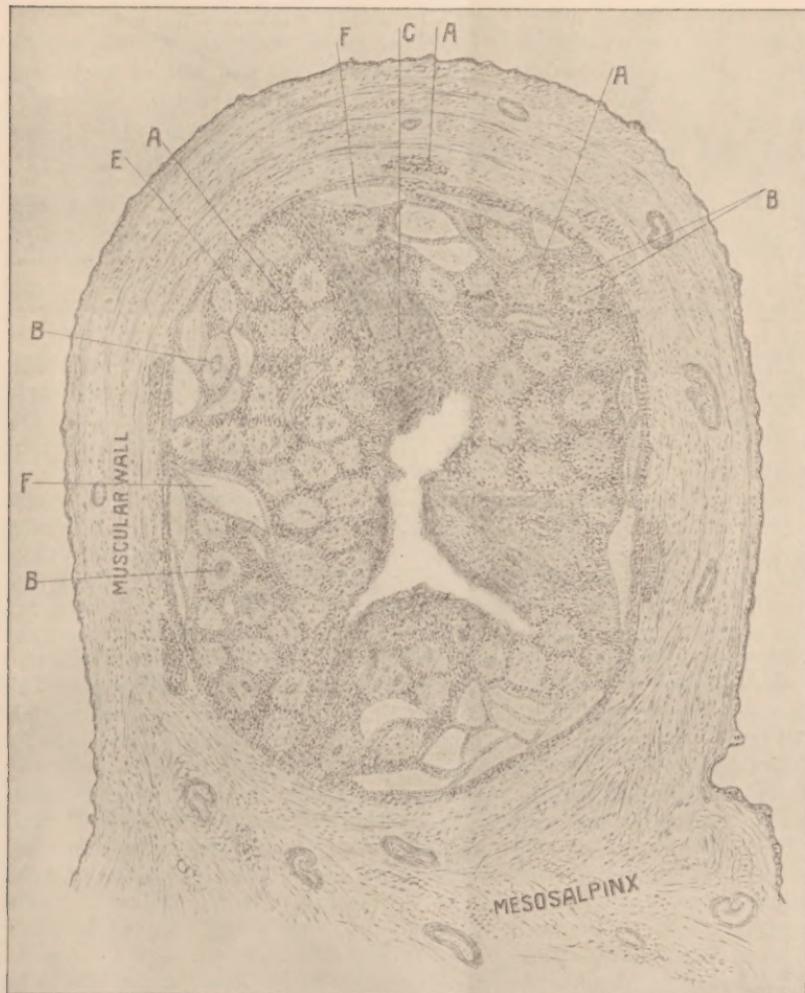
time until the 1st of September she missed her menstrual periods. September 1st she began to flow again, and at times the hemorrhage was so severe that she was confined to her bed; *i. e.*, she would have a pronounced hemorrhage every three weeks and a slightly colored discharge in the interval. About the middle of April, 1893, she began to complain of pain in the left iliac fossa, back, and thigh, and from April 15th until June 5th she was confined to her bed with severe pain in the left iliac fossa. For three weeks before admission she had less pain and was much more comfortable. In May she had an attack of acute cystitis, complaining of pain in the hypogastric region, and frequent and painful micturition; but after a month's treatment these symptoms nearly disappeared, though she continued to be troubled occasionally with frequent and painful micturition, particularly at night. She had severe headache at times, and on admission to the hospital was very anæmic. There was a slight leucorrhœa; the bowels were regular. The patient had always been delicate and unable to do hard work of any kind. She had had the usual diseases of childhood, scarlet fever, pneumonia when ten years of age, and typhoid fever four years ago. When a child, until fourteen years of age, she was much troubled with a hacking cough. Family history: Father and mother living. Mother has cerebral softening; father healthy. Five sisters and four brothers living. Two brothers unhealthy—one suffering with Bright's disease and the other with cardiac disease. Sisters are all delicate, one having had white swelling and necrosis of the femur.

Vaginal examination showed enlargement of the uterus and a small cystic mass in the left ovarian region. The uterine appendages were adherent. Streptococci were found in the vaginal discharge preceding the operation.

Całiotomy, performed on November 23d. A cyst the size of a baseball was found attached to the left ovary. Both tubes were closed, enlarged to the size of a small culture-tube, and universally adherent. The uterus contained in its anterior wall a small submucous fibroid. Cyst, tubes, and ovaries were removed with considerable difficulty, the cyst being ruptured. Cover-glass preparations were made from the tube-contents during the operation, and no bacteria were found. No drainage. Convalescence was uneventful, the temperature never going above 100° F., and being generally normal until December 6th, when the temperature rose to 102.6° F., the patient complaining of headache and feeling generally unwell. Blood was noticed in the urine several times after the operation, but no microscopical examination is recorded. The temperature remained irregular, with an evening rise and morning fall, until February, when, on making a vaginal examination, an intra-uterine polyp, the size of a walnut, was found presenting through the external os. The polyp was removed, and convalescence proceeded without further symptoms until her discharge from the hospital, February 12th. The abdominal wound, after complete primary union, three weeks after operation, broke down, without marked suppuration, and healed very slowly by granulation. Examination of the blood December 4th, ten days after operation, showed the red blood-corpuses to be reduced to 50 per cent.; haemoglobin, to 45 per cent. January 4th: red blood-corpuses, 80 per cent.; haemoglobin, 75 per cent. February 5th: red blood-corpuses, 95 per cent., and haemoglobin, 70 per cent. She left the hospital greatly improved in health, the anæmia having

nearly disappeared. A thorough physical examination of the chest was made several times during her treatment, with perfectly negative results, and no signs of tuberculosis were manifest anywhere.

FIG. 1.



(CASE I.) A. Miliary tubercle. B. Giant-cell. C. Caseation. D. Abscess. E. Small round-cell infiltration. F. Cavities filled with degenerated pus.

Macroscopic Examination of Specimens. The specimens consisted of the tubes and ovaries from both sides, the cyst having been misplaced. The left tube was very tortuous, 10 cm. in length, and covered with dense adhesions destroying its peritoneum; it was generally enlarged, measuring 1.8-2 cm. in its outer third, 1.2 cm. in its middle third, and 1 cm. in its inner third. The abdominal ostium was closed. The tube was rather hard in consistence, and on section the muscular wall was seen to be

greatly hypertrophied, particularly opposite to the attachment of the mesosalpinx, where in its outer third it measured 6 mm. The lumen was obliterated except in its outer third, where the tube was torn; here it contained a small amount of inspissated pus or caseous material. No signs of rugae were noticed. Macroscopically no miliary tubercles could be seen either on the surface or in the sections. The mesosalpinx was completely obliterated, and the ovary was in immediate relation with the tube. The ovary had been considerably lacerated in its removal, and was covered with the same dense adhesions as the tube. It was soft in consistence and somewhat enlarged, measuring 5 x 4 cm. On section, few developing follicles were noticed. The right tube was about the same size and length as the left, covered with dense adhesions, was quite hard in consistence, but the tube lumen was intact. The abdominal ostium was closed, but had been extensively lacerated. The ovary was large and in every way similar to that of the opposite side. The mesosalpinx was also obliterated. No tubercles were detected either on the peritoneal surface of the tubes or ovaries or in making macroscopic sections. The polyp removed several weeks after the primary operation was the size of a walnut, very hard, and evidently fibroid in character.

Microscopic Examination of Specimens. Sections through the middle third of each tube show the entire mucous membrane to be infiltrated with innumerable miliary tubercles in all stages of development. The lumen of the right tube is patent, and the superficial mucous membrane shows marked caseation. A like condition presents itself on the left side, except that the lumen is obliterated in its inner two-thirds, and caseation is perhaps more marked. The greater number of the miliary tubercles present typical giant-cells, and many show beginning caseation; others are simple epithelioid-celled tubercles, giant-cells not having developed. Nowhere in the left tube, and only occasionally in the right tube, can the normal tubal columnar epithelium be found. Where columnar epithelium does exist it is always in relation with the muscular wall and forms the wall of a cavity filled with partially degenerated pus. The greater number of tubercles are surrounded by an extensive small round-cell infiltration which is not infrequently converted into fibrous tissue. Just beneath the mucosa, separated from the muscular wall, and rarely in the muscular wall itself, very near its mucous-membrane margin, small multiple abscesses are sometimes seen surrounded by a marked small round-cell infiltration. The muscular wall is greatly hypertrophied and extensively infiltrated with small round cells. On the surface of both tubes and in all sections a chronic perisalpingitis is demonstrable. Sections through the outer ends of both tubes show caseation to be more marked, but otherwise do not differ from sections through the middle third. Sections made through the uterine ends show the process to be more acute, and almost no caseation can be seen. The tubercles have not reached the same degree of development as in other sections; one or more tubercles extensively surrounded by small round cells can be seen in the muscular wall, and most frequently opposite the attachment of the mesosalpinx. This condition is not found elsewhere. Small round-cell infiltration also seems to be generally more extensive in this portion of the tube. We, therefore, conclude that the disease began in the outer third of the tube. Sections made through the parovarium show the stroma to be intricately infiltrated with miliary tubercles, but caseation has not as yet taken place. The mesosalpinx contains a few tubercles, all

being distant from the tube, the nearest being 5 cm. from its muscular wall. Both ovaries are about equally involved, the oöphoron and part of the paroöphoron being almost completely converted into tubercular tissue, and frequently large areas of caseation are seen. In many parts of the left ovary, in a single microscopic field a number of tubercles can be demonstrated in different stages of development, surrounded by small round cells which take the stain more deeply, and thus present a typical picture of tuberculosis. A large number of sections were stained for tubercle bacilli, and in several of these undoubted tubercle bacilli were found. Sections from the polyp show it to be a fibroid, but nothing characteristic of tuberculosis can be found on its surface. A few cover-glass preparations were made from the urine and vaginal discharge, but no bacilli were found. Although the tubercular infiltration extended to the uterine cornua on both sides, considering the fact that she had no symptoms, and at the time of discharge was rapidly improving in health, we conclude that the disease had not extended to the uterus. From the macroscopic appearances of these specimens we are quite positive in the opinion that tuberculosis could not have been suspected.

These specimens, therefore, present bilateral unsuspected miliary tubercular salpingitis, localized in the mucous membrane, except in the uterine end of the left tube, where tubercles infiltrate the muscular wall; chronic miliary tuberculosis of the ovaries, parovarium, and mesosalpinx, and a small submucous fibroid polyp of the uterus.

This woman is a very respectable person in whom we found no indication that sexual intercourse had been practised. This seems to be a case of primary chronic diffuse tuberculosis of the Fallopian tubes, the disease beginning in the outer parts of these structures.

CASE II.—E. R., American, white, twenty-three years of age, married sixteen months, nullipara, no miscarriages. Menses first appeared at seventeen years, regular, usually lasting seven days, never profuse, but often painful and confining her to bed for a day. She now complains of pain in the left iliac fossa and back. Bowels are regular. Before the present trouble she had always been healthy, except when at fourteen years of age she had a disease diagnosticated as gastric ulcer. The patient has lost much in flesh and strength, and now weighs ninety-two pounds. Family history is negative, except that a paternal aunt died of pulmonary tuberculosis. The symptoms were of such gradual appearance that she could not state when her sickness began. She was sick before marriage, and had become worse after marriage.

Patient's condition before operation: General physical weakness, backache, double ovarian pains.

Vaginal examination showed retroflexed uterus, fundus adherent and small, very tender adherent tubes and ovaries.

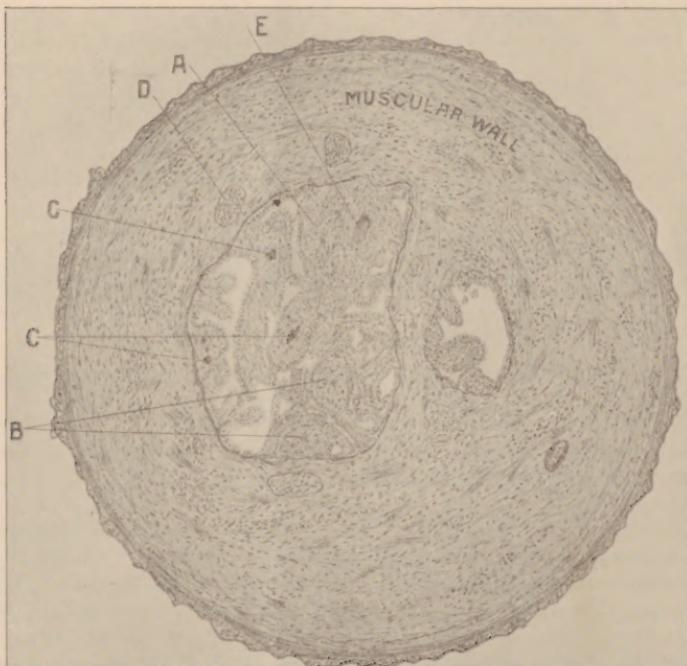
Cæliotomy, performed November 27, 1893. The uterus was found sharply retroflexed; the tubes and ovaries were bound down by dense, firm adhesions. The appendages were removed on both sides and the abdomen closed without drainage.

Convalescence was uninterrupted. She rapidly gained in flesh and strength, and now weighs one hundred and five pounds. She, however, complains of slight pain in the right iliac fossa. A thorough physical examination reveals no signs of tuberculosis.

Macroscopic Examination of Specimens. They consist of tube and ovary from both sides.

The left tube was 7.5 cm. in length, covered with dense adhesions; it was about normal in size, measuring 5 and 7 mm. in its various diameters; and on section was very hard in consistence. The lumen was generally very small, and in many places was almost obliterated and the tube converted into a musculo-fibrous cord. The abdominal ostium was closed and the mesosalpinx much shortened.

FIG. 2.



(CASE II.) A. Epithelioid cell infiltration. B. Miliary tubercle. C. Calcification. D. Abscess. E. Giant-cell.

The right tube was 8 cm. in length, also covered with dense organized adhesions, and the abdominal ostium was closed. The outer two-thirds of the tube was the seat of an old haematosalpinx. On section, the tube was exceedingly hard in consistence, and in the sections through the haematosalpinx small areas of calcification were frequently noticed. In many instances in the uterine end of the tube the lumen was the size of a pin-point or head, and often, particularly as the haematosalpinx was approached, no lumen could be found. The tube measured from 5 mm. in its proximal two-thirds to 9 and 13 mm. in its distal two-thirds. The mesosalpinx was obliterated. The ovaries were small, covered with a few adhesions, and were the seat of a marked hydrops folliculi. They measured 2.5, 3.5, and 4 cm. in their various diameters. Nothing suggestive of tuberculosis was noticed in the macroscopic examination of these specimens.

Microscopic Examination of Specimens. Sections through all portions of the left tube show a much thickened musculo-fibrous wall occasionally infiltrated with small round cells, and as the tube lumen is approached a small miliary tubercle or a minute area of epithelioid cells infiltrating between muscular fibres may be seen. Muscular tissue is still predominant, but the entire tube is characteristically fibrous, the tubercles often being surrounded by a very few small round cells and much fibrous tissue. The mucous membrane is almost entirely destroyed and the lumen edges are composed of fibrous tissue. Where a portion of the rugæ still exists, covered with intact columnar epithelium, the stroma is infiltrated with a miliary tubercle which rarely contains a giant-cell and never shows any signs of beginning caseation. A few small abscesses are seen in the tube wall just beneath the destroyed mucous membrane. The tube is tubercular throughout, the process being, perhaps, most extensive in its outer third, but extending to within 1 cm. of the proximal end, where no tubercular tissue can be found.

Sections through the uterine third of the right tube show a condition almost identical with that of the opposite side, except that frequently the tube lumen is completely obliterated by fibrous tissue, and at other times it is divided into two portions by a band of fibrous tissue running transversely across the section. As the hæmatosalpinx is approached, minute foci of calcification are noted. Sections through the outer two-thirds of this tube or hæmatosalpinx show the lumen filled with degenerated blood, in the centre of which are large areas of calcification. The walls of the tube are here very narrow and are composed of fibrous tissue with an occasional minute miliary tubercle and area of calcification.

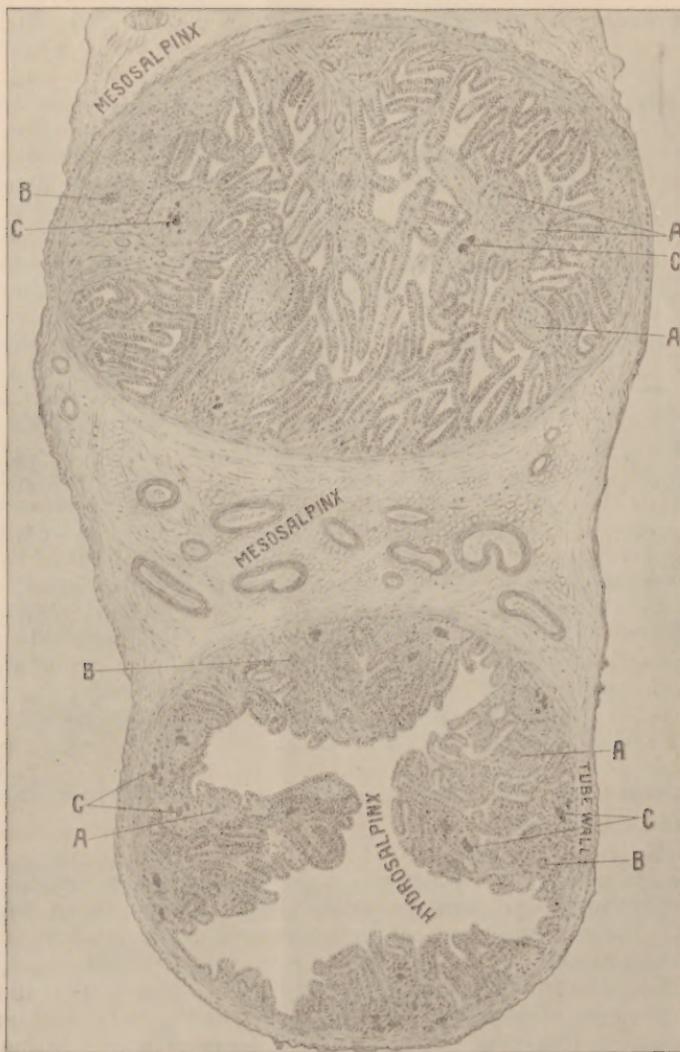
Sections through the parovarium show a few miliary tubercles containing either a small giant-cell, or a focus of calcification, or they are composed wholly of epithelioid cells. Several sections made through each ovary show them to be chiefly composed of follicular cysts, but no tubercular tissue can be found. Although twenty sections were stained for tubercle bacilli and carefully examined, none could be found. These specimens, therefore, present universal fibrous tubercular salpingitis with calcareous degeneration in the right tube and parovarium, a hæmatosalpinx of the outer two-thirds of the right tube and simple hydrops folliculi of both ovaries.

This case seems to be one of primary chronic fibroid tuberculosis of the Fallopian tubes.

CASE III.—E. P., American, white, thirty years of age, married three years, housewife, nullipara, no miscarriages. Menstruation first appeared in her sixteenth year, and has always been regular, lasting three days, never painful or profuse. Her present trouble began eight years ago with pain in the right iliac fossa and back. For a month preceding the appearance of this pain she had a profuse vaginal discharge and complained of frequent and painful micturition. The pain in the right iliac fossa and back continued up to the time of operation, being paroxysmal in character. The bowels had been regular; no leucorrhœa or urinary symptoms. Temperature, pulse, and respiration since admittance to the hospital had been normal. The patient was a small and poorly nourished woman. She had a history of having had some hip-joint trouble on the right side when a child. When admitted there was no

ankylosis of the hip, but there was marked flatness of the right buttock as compared with the left, and asymmetry of the right side of the pelvis. We believe that she had had tuberculosis of the right hip-joint. Mother and father are living and well; two cousins died of phthisis. Her husband is a slight, delicate man and has had a cough for the last three years. He denies having had venereal disease of any kind.

FIG. 3.



(CASE III.) A. Miliary tubercle. B. Giant cell. C. Calcification.

Vaginal examination showed a cystic mass lying to the right and behind the uterus, and a diagnosis of broad-ligament cyst was made.

Cæliotomy, January 16th. The omentum was found adherent, covering the pelvic contents. The large intestine was attached by dense

adhesions to the superior surface of the right broad ligament. A cyst the size of a fetal head was found in the right iliac fossa, developing between the layers of the broad ligament and extending, adherent to all surrounding structures, to the hollow of the sacrum. It was enucleated with extreme difficulty, being ruptured in the procedure. About a pint of clear straw-colored fluid escaped from the cyst. On the left side the tube and ovary were much enlarged and generally adherent. The tube and ovary from the left side, and the cyst-wall and a mass of adhesions from the right side were removed. The right broad ligament was partially sutured. The site of the cyst was drained by a glass tube. Convalescence for ten days was uneventful, the temperature never going above 101.6° F., the drainage-tube being removed the second day following operation. January 26th the temperature became irregular, with an evening rise and morning fall, and she began to complain of pain externally over the right hip joint and the internal anterior surface of the knee-joint. The temperature from January 26th to March 10th was irregular, sometimes remaining about normal for four or five days, and then running up to about 102° F. She had continually complained of pain as described, but, except for this, her condition was markedly improved, all pelvic symptoms having disappeared. Vaginal examination showed firm adhesions on the right side, and the uterus small and in normal position. A thorough physical examination of the chest had several times been made with negative result, and we believe that no tubercular lesion exists in the lungs. When discharged from the hospital, at the end of March, her temperature was continuously normal, and there were no indications whatever of any pelvic or abdominal trouble, though she still complained of some pain in the right hip and knee.

Six weeks after discharge she returned to the hospital complaining of great pain in the right hip, general physical weakness, and progressive emaciation. Vaginal examination was negative. There was no lateral tenderness. There were firm adhesions in the region of the broad ligament cyst. She had night-sweats, dry cough, and irregular temperature. There was marked pain on pressure and on motion in the right hip-joint. We believe that active tuberculosis, latent or perhaps absent since childhood, has been re-established in the hip.

Macroscopic Examination of Specimens. The specimens consisted of tube and ovary from the left side and a mass of tissue from the right side composed of cyst-wall, a portion of a greatly lacerated and flattened ovary, the outer third of a tube, and a mass of old organized adhesions. The left tube was 11 cm. in length, greatly enlarged, particularly in its distal third, where it was dilated into a cyst, the abdominal ostium being closed. It was soft in consistence, appearing as a hydrosalpinx, and was covered with many dense adhesions, causing a partial constriction in its middle third. On section, a small amount of clear fluid escaped; and the lumen, except 5 cm. of its proximal end, was universally dilated, the dilatation being more marked as the abdominal ostium was approached, where it measured 1.2 cm. in diameter. The mucous membrane, except for the separation of rugae, brought about through tubal dilatation, was apparently normal. The muscular wall was very thin, the maximum thickness being 1 mm. The tube was 1 and 1.8 cm. in diameter in the thinnest and thickest portions. The left ovary was 3.0, 3.5, and 4.5 cm. in its various diameters, covered with dense adhesions and the seat of a very marked hydrops folliculi. It contained a

recent blood-clot 1.5 and 2 cm. in diameter. The mesosalpinx was completely obliterated and the ovary was in immediate relation with the tube. No miliary tubercles were noticed on the surface or in section of either tube or ovary. *Right side:* The remaining outer third of the tube, the remnant of ovarian tissue and the cyst-wall were enveloped and separated from each other by a mass of very dense adhesions. The tube was 3 cm. in length, 7 mm. in diameter, stony hard in consistence, and on section the lumen was obliterated. The inferior surface of the ovary was destroyed, and the cyst possibly had developed from its surface. It contained a large number of small follicular cysts. The cyst-wall was thin, smooth on its inner surface, and from its position nothing regarding its origin could be definitely ascertained.

Microscopic Examination of Specimens. *Left side:* Sections made through the proximal and middle thirds of the tube show chronic fibroid tuberculosis, localized wholly in the mucous membrane of a greatly dilated tube or hydrosalpinx. The mucous membrane rugæ are separated, and the stroma is at intervals infiltrated with a miliary tubercle or a few epithelioid cells. The miliary tubercle infiltration is distributed over areas separated by what would be normal mucous membrane except for considerable connective tissue hypertrophy and occasional slight small round-cell infiltration of the stroma; many microscopic fields can be seen without a single miliary tubercle or the least epithelioid-cell infiltration. The tubal columnar epithelium is completely intact in all portions of the section and in all sections. The miliary tubercles always infiltrate the mucous membrane stroma, and are very small as compared with those seen in Case I.; the greater number of the tubercles, perhaps nine tenths, are composed simply of epithelioid cells; they take the stain very poorly, are characteristically fibrous, and are surrounded by exceptionally few small round cells. Giant-cells are remarkably few in number, and are also very small; never more than one being found in a single tubercle, and none show beginning liquefaction necrosis. Occasionally, distributed over all portions of the mucous membrane but particularly as the muscular wall is approached, minute foci of calcification may be seen in a partly or completely destroyed miliary tubercle. The muscular wall is very much narrowed, muscular fibres are frequently infiltrated with fibrous tissue, but no tubercular tissue or small round-cell infiltration can be found in any section. The peritoneal covering of the tube is evidently destroyed, and its place is taken by an irregular layer of fibrous tissue. Sections through the outer portion of the middle third of the tube include a greatly enlarged parovarium which macroscopically resembles a tube, and is almost one-third larger than the tube itself, measuring 1.5 cm. in diameter. Microscopically the parovarium is infiltrated with fibroid miliary tubercles, localized in areas and presenting the same characteristics as those seen in the corresponding portion of the tube. The columnar epithelium is intact. Calcification is not so frequent as in the tube, but otherwise the disease is equally advanced. Sections from the abdominal third of the tube show dilatation much more marked, the muscular wall narrowed, and the lumen much larger than in other parts of the tube. The number of tubercles is greatly increased in this third of the tube, the stroma of the mucous membrane being much more extensively infiltrated with the same form of tubercular tissue. It is, therefore, noticeable that the tubercular process becomes continually more extensive as the abdominal

ostium is reached. No areas of distinct caseation can be found anywhere. The mesosalpinx is not involved. Sections through the ovary show it to contain a large number of follicular cysts and a corpus luteum composed of degenerated blood, but nowhere in several sections made from this ovary can tubercular tissue be found. *Right side:* Sections through the remaining portion of the tube show the lumen almost obliterated, the mucous membrane destroyed, and the tube wall composed of fibrous tissue. Sections through the lacerated ovarian tissue show many follicular cysts and a few developing follicles. The cyst wall is composed of fibrous tissue, the lining cells, if any, having been destroyed. Fifteen sections from the left tube were stained for tubercle bacilli and three typical undoubted bacilli were found. All three bacilli were found in simple epithelioid tubercles.

These specimens, therefore, present chronic fibroid tubercular salpingitis, or hydrosalpinx, with calcification of the left tube, the disease being most marked in the distal third; chronic fibroid tuberculosis of a greatly enlarged parovarium, also with calcification, but less marked; chronic perisalpingitis and periovaritis of the left side; chronic inflammation and hydrops folliculi of both ovaries, most marked on the right side; chronic fibrous salpingitis and a cyst of unknown origin of the same side. That the specimens from the right side were primarily tubercular we cannot say, as nothing characteristic of tuberculosis was found; but since this disease frequently terminates in fibrous tissue, and the disease of the opposite side was of the fibroid form, we believe tuberculosis best explains the condition found. That tuberculosis could not have been suspected from the macroscopic appearances of these specimens we think is self-evident.

The case is probably one of secondary chronic fibroid tuberculosis of the Fallopian tubes, the primary lesion existing in the right hip-joint.

CASE IV.—Admitted to hospital March 30, 1894. Mrs. G., American, white, forty years of age; married; housewife; nullipara, no miscarriages. Menstruation first appeared when she was thirteen years of age, and until two months before her admission to the hospital had always been regular, lasting two to three days, and occurring every four weeks. It then became irregular, occurring every three weeks, and continued five to six days. One month before the change in menstruation she began to have pain in both iliac fossæ, and experienced bearing-down sensations. The pain became progressively more severe, and continued up to the time of operation, being most severe during the menstrual period and when in the recumbent position. She has been constipated for the past three months, or since the appearance of the first symptoms, and defecation has been associated with considerable pain and feeling of obstruction. She has never had leucorrhœa; there were no urinary symptoms. Temperature, pulse, and respiration for twenty-two days preceding operation were normal. The patient is a well-nourished woman, weighing about one hundred and twenty pounds, and, except for the diseases of childhood and dyspepsia several years ago, has been perfectly healthy. Her mother and father are living and well. Her husband is healthy. Two sisters died in confinement. Six sisters and one brother are living. One sister has a uterine fibroma and dyspepsia, and another has had a cough since childhood. The others are healthy. An uncle died of consumption.

A careful physical examination revealed no signs of tubercular trouble. Vaginal examination revealed a hard mass, about the size of a base-ball, behind and to the left of the uterus. The uterus was normal in size, and was adherent to the mass. Abdominal examination was negative.

Cæliotomy, April 20, 1894. The omentum and parietal peritoneum were seen to be occasionally studded with miliary tubercles, which were very small, transparent, and evidently of recent formation. The number of miliary tubercles progressively increased as the pelvis was reached, and were most numerous in relation with the site of the left uterine appendage. The omentum was adherent over the bladder and fundus of the uterus, the rectum adherent to the fundus of the uterus, and the vermiform appendix was attached by a strong band of adhesion to the right ovary. The right ovary and tube were apparently normal, the abdominal ostium of the tube being patent. The left ovary and tube were imbedded in a mass of adhesions behind the uterus. This mass was the size of a base-ball, quite as hard as a fibroid tumor in consistence; it completely filled Douglas' pouch, and extended, adherent to all surrounding structures, well down toward the left ischio-rectal fossa. The peritoneal cavity contained no fluid. It was quite evident that the disease originated in the left uterine appendage, as miliary tubercles were much more numerous on the left side, and in the pelvis they seemed to be larger in size and were here opaque. The mesenteric and pelvic lymphatic glands were but slightly, if at all, enlarged. The removal of the mass of tuberculous tissue was considered to be impossible, and, therefore, after irrigating with distilled water and introducing two strips of gauze to the floor of the pelvis as a means of drainage, the abdomen was closed. Convalescence was uninterrupted, the temperature, pulse, and respiration reaching normal on the fourth day after operation, and they have since continued normal and regular. Since the operation the patient has complained of some soreness over the tract of drainage, pain in the left iliac fossa, and slight pain in defecation and micturition. Her appetite has improved; she has gained a little in weight and strength, and on leaving the hospital, one month after operation, believed herself well.

Macroscopic Examination of Specimen. The specimen was a small portion of the great omentum, removed for the purpose of microscopic examination. Its surface was studded with a few miliary tubercles, which were small, measuring 1 to 1½ mm. in diameter, and transparent, and could scarcely be recognized with the naked eye. They were discrete, slightly raised above the surface, and separated from each other by 1 to 2.5 cm. of apparently normal peritoneum.

Microscopic Examination of Specimen. The miliary tubercles were separately excised, hardened in absolute alcohol, imbedded in celloidin, and stained with Delafield's haematoxylin and eosin. Each miliary tubercle is found to be composed of three, four, or six minute tubercles, the greater number of which contain a typical giant-cell, with an unusual number of central nuclei. The giant-cells are surrounded by a large number of epithelioid cells, a small amount of connective tissue, and a few small round cells. No tubercle bacilli are found, yet the tissue described could only be characteristic of tuberculosis.

Since the miliary tubercles were discrete and transparent, the giant-cell nuclei numerous and always occupying the centre of the cell, and the

connective tissue and small round-cell infiltration not marked, we conclude that the peritonitis must have been in an early formative stage and of short duration. Although microscopic examination of the left Fallopian tube was impossible, yet from the macroscopic appearance during the operation, considering the fact that it was very hard in consistence, and covered with dense fibrous adhesions, that the developing peritonitis was of undoubted tuberculous origin, as shown by microscopic examination, and that the mesenteric and pelvic lymphatic glands were not enlarged, and no other tubercular lesion could be found, we believe it evident that this case represents an instance of primary tuberculosis of the female genital organs, most probably of the left Fallopian tube, with secondary tubercular infection of the peritoneum.

CASE V.—M. H., American, white, thirty years of age, married six years, tailoress; nullipara, no miscarriages. Menstruation first appeared in her sixteenth year, and has always been regular, lasting three to four days, but usually preceded by pain. Six and a half years ago, while working hard on a farm, she first noticed that she was losing in flesh and strength, and six years ago, or immediately after her marriage, without any apparent cause, she began to have pain in the right iliac fossa and back, referred down the right thigh. The pain was always worse during the menstrual period, and, with a gradual loss of flesh and strength, increased somewhat in intensity, although it was never very severe until her admission to the University Hospital, May 1, 1894. She has had leucorrhœa for many years. She is usually constipated, and is sometimes troubled with painful micturition. On admission to the hospital she was anaemic, and complained of pain as described. Temperature 99° F., pulse 80, respirations 22. She has had the usual diseases of childhood, including scarlet fever and a mild attack of pleurisy about six years ago, but otherwise has been perfectly healthy and able to do hard work, either on a farm or at her trade. Father and mother are living and well. One brother died of typhoid fever. Four sisters and two brothers are living—one brother now has consumption, the others are healthy. Her husband is apparently healthy.

On vaginal examination the uterus was found small and retroflexed, the right ovary enlarged and adherent to the right uterine cornu.

Cæliotomy, May 4, 1894. The omentum was adherent to the parietal peritoneum on the right side of the abdominal incision. The intestines, omentum, parietal peritoneum, broad ligaments, bladder, and uterus were seen to be uniformly studded with numerous discrete opaque or transparent miliary tubercles about the size of a millet-seed, evidently of recent formation. The peritoneal cavity contained no fluid. The right tube and ovary were found covered with dense adhesions and miliary tubercles, and adherent to all surrounding structures. The left broad ligament was very short and inclined downward. The left tube was small, almost uniform in diameter from the proximal to the distal end, and terminated very near the pelvic wall in a closed end. In the operation it was necessary to include the distal portion of the tube in the ligature of the ovarian artery; no left ovary could be found. There were no signs of inflammation on the left side of the pelvis. There seems to have been congenital absence of the ovary with malformation of the tube. The right ovary and tube were dissected away with considerable difficulty, and removed with the uterus and part of the left tube. The abdominal cavity was closed without irrigation or drainage.

Although convalescence was slow it was uneventful, except that the temperature reached 102.4° F. on the third day following the operation, and remained continually and regularly high until the ninth day, when it reached normal, but has been somewhat irregular since. The pulse remained about normal, the greatest rapidity being 90, when the temperature was 102.4° F. The patient left her bed at the end of the third week. She still complains of some pain in the right iliac fossa and back, but is otherwise slowly improving. Examination of the blood three weeks after operation showed the number of red blood corpuscles to be 95 per cent. and the haemoglobin to be 70 per cent. A thorough physical examination revealed a small area of impaired percussion-resonance over the base of the right lung, the probable result of an old pleurisy, but no signs of tuberculosis could be found anywhere.

Macroscopic Examination of Specimens. The specimens consisted of the tube and ovary from the right side, the fundus and supra-vaginal portion of the cervix of the uterus, and a portion of the left tube. All specimens and all portions of each specimen were covered with numerous miliary tubercles, which were generally somewhat larger than a millet-seed, and transparent or opaque. The right tube was 9 cm. in length, and covered with dense adhesions. The fimbriated extremity was lacerated, the abdominal ostium closed, and no signs of fimbria could be seen. The distal two-thirds was very much enlarged, measuring 1, 1.5, and 2 cm. in diameter, almost stony hard in consistency, and seemed to be composed of nodules or tubercles the size of a pea. The enlargement began almost abruptly at the junction of the middle and proximal thirds, and gradually increased as the fimbriated extremity was reached. The proximal third of the tube was of uniform and normal size, measuring 5 cm. in diameter, and was also very hard in consistency. On section, the distal two-thirds was seen to be composed of fibrous tissues arranged in the form of nodules or tubercles; the tube was patulous in the middle third, the proximal half of which contained a small amount of insipid pus or caseous material, and the distal half a small focus of coagulated blood. The lumen was obliterated in the distal third. The proximal third of the tube showed nothing abnormal except that the muscular wall was unusually resisting. The lumen was very small, but patent. No tubercles showed any signs of caseation, and no caseation was seen except in the lumen of the proximal half of the middle third. It was evident from the macroscopic appearances of the distal two-thirds of this tube that it was the seat of chronic fibroid tuberculosis. The mesosalpinx was but little shortened, covered with a few dense adhesions in relation with the tube, and contained a nodule 1.5 cm. in length which could be rolled between the fingers, and was considered to be an enlarged parovarium. The ovary was enlarged, measuring 4, 3.5, and 2 cm. in its various diameters, rather soft in consistency, covered with a few dense adhesions on its inferior surface, and was the seat of an extensive hydrops folliculi, many of the cysts containing blood. The uterus was very small, measuring 5 cm. in length, 5 cm. in breadth at the fundus, and 3.5 cm. at the cervix. Its peritoneal surface, except for miliary tubercles, was smooth and normal. The fundus was of about normal consistency, and the cervix hard and resisting. On section, the muscular wall appeared normal, the uterine mucous membrane was hemorrhagic, distinctly thickened, measuring 4 and 5 cm. in various portions of the fundus, and numerous minute tubercles could be seen and felt

slightly raised above the surface. The Nabothian glands were prominent. The entire mucous membrane was the seat of a very chronic endometritis. The remaining portion of the left tube was 3 cm. in length, 5 cm. in diameter, abnormally hard in consistency, and its lumen, though exceedingly small, was patent.

Microscopic Examination of Specimens. *Right side:* Sections made through the *distal two-thirds* show chronic fibroid tuberculosis involving and almost completely destroying the mucous membrane, and infiltrating and distorting the muscular wall at short intervals. The disease is most extensive toward the centre of the tube, and becomes less and less marked as the destroyed peritoneal surface is approached. The mucous-membrane stroma in the distal third of the tube has been destroyed and replaced by tubercular tissue; and only occasionally, and always in relation with the muscular wall, can mucous-membrane stroma surrounded by its columnar epithelial cells be seen. The areas of this partially diseased stroma become more frequent toward the proximal third of the tube. A few fibres of stroma are very often seen separated and surrounded by tubercular tissue away from the muscular wall and in the centre of the tube in all sections. The columnar epithelial cells are always small in size, and are not only seen in relation with the muscular wall, but also partially or completely surrounded by miliary tubercles, or they appear as the end of a separated ruga in the centre of the tube. Where mucous membrane stroma still exists surrounded by its columnar epithelium, it forms the walls of numerous cavities containing either degenerated blood or a small amount of inspissated pus. The miliary tubercles are almost entirely composed of epithelial cells, which take the haematoxylin stain unusually poorly. The tubercular tissue is not only found as distinct miliary tubercles, but more frequently epithelioid cells and a few small round cells replace the stroma of a completely or partially destroyed ruga, separated from like ruga by a few columnar epithelial cells. The small round cell infiltration is exceedingly small in amount, is not arranged around tubercles, but is uniformly distributed in every part of the tubercular tissue. Considerable fibrous tissue can be seen surrounding each tubercle and infiltrating tubercular tissue. Giant-cells are very rarely seen, the greater number of tubercles being composed of simple epithelioid cells and a few small round cells. The giant-cells are very large, occupying the greater part of the tubercle, and usually contain many central nuclei. They are most frequently seen in tubercles near or just within the muscular wall. One or two minute foci of calcification may be seen in every section. Sections through the *middle third* of the tube show the lumen to be present and its edges composed of tissue undergoing caseation. The lumen is largest in the distal half of the middle third of the tube and contains a small amount of blood. In the proximal half of the middle third the lumen is partially filled with inspissated pus or caseous material. The lumen is entirely obliterated in the distal third of the tube. The tube wall is very much hypertrophied, particularly in the distal third. It is the seat of an extensive and irregularly distributed small round-cell infiltration, and frequently, particularly near the mucous membrane edge, a large miliary tubercle is seen, surrounded by numerous small round cells. The most pronounced tubercular infiltration of the tube-wall is seen in the middle third, and here also an occasional large area of caseation with beginning liquefaction necrosis can be seen. These

areas of caseation are very near the surface of the tube, and are covered with a thin layer of fibrous tissue. It therefore seems very probable that the peritoneum was infected from the middle third of the tube. The *proximal third* of the tube: Sections through this portion of the tube show the mucous membrane to be infiltrated with a few miliary tubercles, surrounded by and containing distinctly more small round cells than those of the distal two-thirds of the tube, but as the proximal half of this third is approached, all tubercular tissue disappears and only the least amount of small round-cell infiltration can be seen. In other words, the tube is almost normal in the half toward the uterine cornu.

Small round-cell infiltration is frequent in the tube-wall toward the middle third of the tube, but contains no tubercular tissue. The tubercular disease is, therefore, almost wholly localized to the distal two-thirds of this tube. Sections made through the middle third of the tube include the parovarium, mesosalpinx, and a small portion of ovarian tissue. The parovarium is enlarged, and the stroma is in many places infiltrated with fibroid miliary tubercles having the same characteristics as those seen in the corresponding portions of the tube, except that small round-cell infiltration is much more marked. Much of the parovarium stroma is normal, and surrounded by intact columnar epithelial cells, the tubercular disease being limited to small areas. The mesosalpinx, except for a slight small round cell infiltration in that portion near the tube, and an occasional acute miliary tubercle and a small amount of fibrous tissue on its surface, is normal. No miliary tubercles can be seen in the mesosalpinx.

The portion of *ovarian tissue* is normal. Several sections made through the ovary show it to be covered with a capsule of dense fibrous tissue. The oöphoron contains a large number of small cysts, many of which are filled with degenerated blood—hydrops folliculi. One section shows a single acute miliary tubercle on the surface of the ovary, but otherwise no tubercular tissue can be found anywhere in any section. Thus, the ovary is not included in the primary tubercular process.

Left side: Sections made through the remaining 3 cm. of the tube show nothing abnormal.

The uterus: Sections were made through its entire length from the supra-vaginal portion of the cervix to the peritoneal surface at the fundus, including endometrium, muscular wall, and peritoneal covering. Some were made in relation with each cornu. These show the endometrium to be much thickened because of a chronic glandular endometritis, and frequently in that portion toward the fundus, and particularly in each uterine cornu, small areas of miliary tubercular infiltration are seen. The infiltration always involves the superficial portion of the endometrium; it is localized to small areas composed of one or two, to six, minute miliary tubercles very extensively surrounded by a small round-cell infiltration. These tubercular areas become larger and more frequent toward the fundus, and particularly in the right uterine cornu. In the endometrium, away from the fundus, they are small, composed of a single miliary tubercle surrounded by an extensive small round-cell infiltration, and none can be found in the lower half and cervix. The small round cell infiltration is so very extensive that it is easily recognized; where no tubercles seem to exist an area of small round-cell infiltration is often demonstrable. An excessive number of small round cells and no inter-cellular substance is seen. The miliary tuber-

cles, except for the extensive small round-cell infiltration, do not seem to differ from those seen in the right tube. Giant-cells are not more frequent, and have the same characteristics. No caseation or calcification can be seen. Sections made transversely across each uterine cornu show the disease occasionally infiltrating the endometrium as a single miliary tubercle, but as the tube is approached they disappear. Miliary tubercles are more frequently seen in sections in relation with and through the right uterine cornu than in those through the left cornu. The glandular spaces throughout the endometrium are abnormally large, and the gland-cells are very often separated or have entirely disappeared. The stroma, except where miliary tubercles exist, is small in amount, the endometrium being mostly composed of partially destroyed utricular glands. The Nabothian glands are very large, and filled with a material which takes the stain poorly. The muscular wall and peritoneal covering seem normal. None of the sections included an acute miliary tubercle.

The uterus, therefore, shows chronic glandular corporeal endometritis and chronic cervical endometritis, with discrete miliary tubercular (most probably fibroid in character) infiltration of the upper half of the corporeal endometrium; also that the tubercular infiltration was most extensive in relation with the uterine cornua, particularly the right; that it becomes less frequent toward, and entirely disappeared in, the lower half of the corporeal endometrium, and that it also disappeared within each uterine cornu. That the endometrium was secondarily infected from the distal two-thirds of the right tube is beyond doubt, since the disease in these portions of the tube was more extensive, was chronic, and the lumen contained caseous material. Six sections made through the distal two-thirds of the tube were stained for tubercle bacilli and five typical bacilli were found. The fact that the disease of the right tube was almost entirely localized to its distal two-thirds is of particular interest, showing that primary infection, as is believed by all observers, must have taken place in this portion of the tube, and, because of the normal more intricate folding of the mucous membrane, thus affording better conditions and protection for the growth of the tubercle bacillus. Why the proximal third of the tube was not secondarily more extensively affected we do not know; but this fact, with the secondary infection of the endometrium, which infection disappeared within the uterine cornua, demonstrates that, although sections through the last centimetre of the uterine end of the tube show no tubercular infiltration, the endometrium may be the seat of secondary infection. From the macroscopic and microscopic examinations of these specimens showing a very chronic and extensive form of fibroid tuberculosis of the right tube, and from the more extensive fibroid tubercular infiltration and areas of caseation in the wall of the middle third of the tube, we believe that the peritoneum was secondarily infected from this portion of the right tube.

These specimens, therefore, present: Chronic primary fibroid tubercular salpingitis, with calcification, of the right tube, the disease being almost wholly localized in the distal two-thirds; chronic secondary fibroid tuberculosis of an enlarged parovarium; chronic perisalpingitis of the right side; chronic inflammation and hydrops folliculi of a single (right) ovary; secondary fibroid tuberculosis of the upper half of the uterine endometrium, with chronic glandular corporeal endometritis and chronic cervical endometritis; and acute secondary tubercular peritonitis.

In none of the cases here reported was tuberculosis suspected. In the last two cases the condition was recognized as soon as the peritoneum was opened. In the first three cases the condition was impossible to recognize until the specimens removed had been subjected to microscopic examination. Without this examination the cases would have gone on record with the usual diagnosis of "adherent tubes and ovaries."

Cases I., II., and IV. seem to belong to the class of primary tuberculosis of the tubes, since no tubercular lesion could be found elsewhere; there was no history of any previous tubercular trouble; and in I. and II. marked improvement in the general health followed the operation.

In Case III. we believe the tubal trouble to be secondary to old tubercular disease of the hip.

In Case V. there is some little doubt about the primary character of the tubal tuberculosis, on account of the history of pleurisy, and from the fact that examination of the chest was not altogether negative.

There was nothing in the symptoms presented by any of the cases to indicate that tuberculosis of the tubes or of the peritoneum existed; nor was anything elicited by a bimanual examination of the pelvis which enabled us to make a diagnosis other than that of adherent tubes and ovaries. When tubercles exist on the peritoneum of the fundus and posterior surface of the uterus, we believe that a diagnosis can be made by dragging down the uterus with a tenaculum and examining per rectum. If this method of examination had been followed in Case V. we feel confident that tuberculosis could have been diagnosed.

One point which strikes us in reviewing the histories of these cases is that all the women had been sterile, though four were married. In this respect these histories differ from those of ordinary cases of non-tubercular salpingitis, where in the great majority there is a history of at least one child or miscarriage before the disease reaches such a stage as to render the woman sterile.

The account of the beginning of the disease is too vague in all the cases for us to determine the time with any degree of certainty. From the fact of sterility, however, we conclude that tubal disease existed before marriage, either as tubercular or as a preceding inflammatory condition. We cannot determine certainly in any case whether tuberculosis existed primarily, or whether tuberculosis was grafted upon a pre-existing salpingitis. We think, however, that tuberculosis was the primary tubal lesion, at least, in the cases of the married women.

The common causes of non-tubercular salpingitis occur after marriage—sepsis and gonorrhœa; and in the disease from each of these causes one or more pregnancies may occur. No such history, however, is given by the cases which we have reported. Sterility existed from the beginning, and the disease seems to have antedated marriage.

We have stated that the five cases reported were found in a series of twenty-five cœliotomies for pelvic inflammatory trouble. Therefore, our results show that about 20 per cent. of such cases are tubercular in character, and that 12 per cent. of them belong to the class of cases called unsuspected tuberculosis of the Fallopian tubes. The total number of cases is too small to warrant the conclusion that 20 per cent. represents at all accurately the proportion of tubercular to non-tubercular cases of salpingitis. We believe that it is the largest per cent. which has been recorded; Williams reports 7.7 per cent. of tuberculosis in ninety-one cases of perisalpingo-oophoritis.

From a pathological standpoint these cases are divided into: First. Primary chronic diffuse tubercular salpingitis (Case I.). Second. Primary chronic fibroid tubercular salpingitis with calcification (Case II.) Third. Secondary tubercular peritonitis, the primary lesion being in the Fallopian tube (Cases IV. and V.). Fourth. Secondary chronic fibroid tubercular salpingitis with calcification (Case III.). The characteristics of the first are that the mucous membrane is partially or completely replaced by innumerable miliary tubercles surrounded by an extensive small round-cell infiltration, and that large areas of caseation are very frequently seen. Caseation becomes more marked as the lumen and the distal two-thirds of the tube are approached. The muscular wall of the tube may be infiltrated to a greater or less degree. This form would represent tubercular pyosalpinx. The second form differs from the first in that considerable fibrous tissue is seen within and around the tubercles, and that small round-cell infiltration is very small in amount and uniformly distributed in all parts of the tubercular tissue; also, that caseation is very rarely seen or is absent, and calcification very frequently occurs. The disease in this form may be limited to a portion of the tube, as in Case V. The characteristics of the third form are apparent and well known. The fourth form does not differ pathologically from the second. The specimens from four of the cases consisted of one or both tubes and ovaries, and in one case the uterus. In two of the four cases the tubercular salpingitis was bilateral. The ovaries were involved by the tubercular process in only one case. In the only instance where the uterus constituted part of the specimens it was the seat of chronic fibroid tubercular endometritis. This form of tubercular disease of the uterus is mentioned as being possible by Williams, but he reports no case. In all four cases the parovarium was affected by the tubercular process. As far as we can learn, tuberculosis of the parovarium has never been mentioned. As regards these four cases, the order of frequency of tuberculosis in the female genital tract is as follows: tubes, parovarium, uterus, ovaries. Case V. is interesting in that the peritoneum was infected from a chronic fibroid tubercular salpingitis, giving an instance where this form of tuberculosis was not a conservative pro-

cess. Considering the frequency of unsuspected and suspected primary tuberculosis of the female genital tract and its termination in tubercular peritonitis, as shown by Williams and in this paper, it seems to us very probable that tubercular peritonitis in women has its origin in the female genital tract far more frequently than statistics show and is generally supposed. Should all organs found to be tubercular at autopsies on women dying of tubercular peritonitis be subjected to microscopic examination, thus determining which one of the lesions were the more chronic, we believe much would be learned.

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